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ABSTRACT

Project SKILL (Skill Development Through Individual Learning Levels) was developed and tested for three years at Midland School, Washington. This final report describes the context of the project, and provides a description of the scope of the project and an evaluation of its effectiveness. The goals of the project were to: (1) individualize instruction so that each student works in a program which is relevant to his needs with the attainment of appropriate achievement levels; (2) promote good student attitudes toward learning in subject areas where curriculum has been individualized; and (3) promote good teacher attitudes toward working with students in individualized programs. During the first two years of the project, a large resource center was developed for the individualization of instruction in mathematics for 240 students in grades three through six. In the third year (1971-72) reading was individualized for 360 students in grades one through six and a primary resource center was developed to support this program. A detailed evaluation of the project indicated, among other things, a significantly higher achievement in mathematics and an improvement of student attitudes toward school and mathematics, and supported the validity of using such an instructional approach in the elementary school setting. This work was prepared under an ESEA Title III contract. (JR)

TITLE III

PROJECT SKILL

FINAL REPORT

1969 - 1972

FRANKLIN PIERCE SCHOOL DISTRICT #402

DR. E. E. HILL, SUPERINTENDENT

TITLE III

PROJECT SKILL

SKILL DEVELOPMENT THROUGH INDIVIDUAL LEARNING LEVELS

FINAL REPORT

1969-1972

FRANKLIN PIERCE SCHOOL DISTRICT NO. 402

Directed by:

Dr. Edward E. Hill, Superintendent

Alan J. Hokenstad, Project Director

Dr. Oren Glick, Evaluator

June, 1972

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PROJECT SUMMARY

Project SKILL (Skill Development Through Individual Learning Levels) has completed three years of operation at Midland School (1969-1972). During the first two years of the project, a large resource center was developed for the individualization of instruction in mathematics for 240 students in grades three through six. During the 1971-72 school year reading has been individualized for 360 students in grades one through six and a primary resource center was developed to support this program.

The basic system of teaching involves the use of Individually Prescribed Instruction. Research on IPI in experimental schools is conducted by the Learning Research and Development Center at the University of Pittsburgh. Field testing, field development and dissemination is conducted by Research for Better Schools, Inc., a regional educational laboratory based in Philadelphia, Pa.

A continuum of behaviorial objectives has been developed for both mathematics and reading so that students can make continuous progress through the sequence of the curriculum. Teachers prescribe appropriate activities for each child based upon a careful diagnosis of pre-test scores and other accumulated data.

In addition to IPI materials, a variety of commercial and teacher-made materials have been added to the program in order to

expand the capabilities of the staff in providing an individualized program for each child.

Project SKILL requires the assistance of teacher aides who work as supportive personnel to staff the resource centers and assist in the correction of materials.

Project Goals:

1. To individualize instruction so that each student works in a program which is relevant to his needs with the attainment of appropriate achievement levels.

2. To promote good student attitudes toward learning in subject areas where curriculum has been individualized.

3. To promote good teacher attitudes toward working with students in individualized programs.

PROJECT CONTEXT

The Community:

The Franklin Pierce School District is located directly south of Tacoma, and it represents one of the typical suburban-rural "bedroom" communities on the periphery of a major city.

A variety of educational and cultural attractions are found within the city of Tacoma. These include a zoo, aquarium, art gallery and the Washington State Historical Society Museum.

Pacific Lutheran University is located within the boundaries of the district and The University of Puget Sound is within a short driving distance. In addition, Fort Steilacoom Community College and Tacoma Community College offer higher education programs for graduates from high schools in the area.

Two major military installations are located southwest of the Franklin Pierce School District. Thousands of enlisted men and officers are stationed at the McChord Air Force Base and Fort Lewis Army Post and some of them reside in the district with their families.

The Seattle metropolitan area is approximately 30 miles north of Tacoma, and the students of the district have opportunities to visit Seattle galleries, museums, the Pacific Science Center and other facilities.

Description of the Franklin Pierce School District:

The Franklin Pierce School District is organized under the 6-3-3 plan with nine elementary schools, two junior high schools, and a district special education diagnostic center. The district contains an area about five miles square with a total population of about 31,000 citizens.

Enrollment in the school district grew at a very rapid rate from 1950 to 1968. In 1950 the enrollment was slightly over 1,700 and by 1968 it had reached 8,476. There were 4,585 students enrolled in 1955 and 8,476 in 1968 - a growth of 84%. The growth rate during this time of expansion usually averaged between 5 and 10%. Recently this growth rate has reversed itself because of a declining birth rate, a sluggish housing market, the lack of sewers and increasing unemployment. Enrollment for the period from 1966 to 1970 reflects this decline:

YEAR	ENROLLMENT	INCREASE OR DECREASE
1966	7,876	---
1967	8,202	+4.1%
1968	8,476	+3.3%
1969	8,500	+ .3%
1970	8,422	- .9%
1971	8,294	-1.5%

Of all first-class school districts in the state, the district has the second lowest property tax valuation per pupil. Inspite of the low tax base, the district has had remarkable success at the polls. The district has never failed to receive less than a 60% favorable vote on any issue submitted to the electorate. Two issues, in the history of the district, failed to validate because of the 40% requirement, but these issues were subsequently approved.

The Franklin Pierce District is just completing its first year

of participation in the Experimental Schools Project, a multi-year project in educational innovations financed by a direct grant from the United States Office of Education. This project focuses on a variety of approaches for alternative schools. Franklin Pierce was selected for this grant on the basis of the district's past achievements in educational change. Initially, Midland Elementary School is not a part of the Experimental Schools Project since only half of the district is involved for the first two years.

Description of Midland Elementary School:

Midland School was designated as the facility to be used in testing the objectives of Project SKILL. It is a K-6 school and houses about 410 students in two classes at each grade level.

The building is old but has been well maintained over the years. The intermediate grade classrooms were built in 1940 and the primary classrooms were added in 1950. Minor remodeling was done by the district to accomodate the needs of Project SKILL.

The Midland School community contains a cross-section of people of various economic means. Many homes are located on large lots or small parcels of acreage so that most children have pet animals and opportunities to do gardening and other outdoor work. In the summer, many older children help with the harvest of fruits and vegetables in the Puyallup valley.

Most children in the school are in the average range on intelligence tests, with few classified as "gifted" or "remedial".

The Midland community has been most supportive of the school over the years. The biggest problem has been a reluctance on the part of senior citizens to vote for special levies because of the difficult property tax burden which is imposed upon them.

Program Description

Scope of the Program

Personnel:

The Midland School principal spent approximately half of his time as Project SKILL Director. Iver B. Eliason served in this position for the first two years of the project (1969-71) and Alan J. Hokenstad was Principal and Project Skill Director in the final year (1971-72).

The Project Director was trained in the Individually Prescribed Instruction philosophy and implementation procedures. He conducted continuous inservice training for all staff members. In the first years of the project, a Project Skill study team worked directly with the principal to formulate objectives and study results. In the past year, a building curriculum committee (elected by the faculty) served as a coordinating council to work with the principal on project goals.

The Project Director worked with the Project Clerk to order materials, organize the physical setting, and schedule assignments for the teacher aides. He taught in classes whenever possible to keep up with the progress of the program.

The Project Director wrote all documents for dissemination to the public and the Office of the State Superintendent of Public Instruction. He supervised the collection of raw data, and worked with program evaluators in analyzing results.

The classroom teachers were each assigned a group of students each year for which they were accountable in the project. They normally worked in teams of two in a double classroom in a cooperative teaching plan which was devised as part of the project. (One writes prescriptions and the other teaches individuals or small groups.) Much emphasis was placed upon tailoring each learning task to fit the needs of every individual student. Before entering the project, the teachers were oriented toward the project goals and procedures so that the students could be properly instructed and continuity could be maintained throughout the school.

During the last year of the project, the district added a school counselor to the staff at Midland. She worked in Project Skill about 60% of the time and provided a valuable service in helping students who have difficulty in learning. Most of her teaching was done in the regular classrooms as an additional member of the instructional team. This was an ideal situation since her "special education" students were helped in the regular classroom with Project SKILL materials. In this setting, the students did not suffer the stigma of leaving the classroom to get special help since they used materials which were a regular part of the curriculum.

Teacher aides worked directly in the individualized program as members of the teaching team. As part of Project SKILL, members of the faculty and paid teacher aides were trained in procedures designed to make them more effective members of teaching teams. Working relationships were formulated and roles were defined. The teacher aides worked in the following ways:

1. Score and record student work.
   a. Prepare flow charts
   b. Maintain students permanent IPI folders.
   c. Collect evaluation data as requested.

2. Assist students and teachers in obtaining IPI materials.

3. Assist students and teachers with audio-visual materials, manipulative aides, and other Project SKILL materials.

4. Cooperate with teachers in facilitating classroom management.

5. Explain aides' roles to visitors.

Statement of Needs:

Educational research in the 1960's pointed out the need for curricular developments which emphasize the uniqueness of each individual and account for the differences which are found in each child. All students need to have their strengths and weaknesses assessed so that instructional objectives can be developed which relate to the students' needs. Teachers need appropriate training in individualized instruction modes and the use of specialized materials. Staffing patterns need to be structured so that students get the most benefit from the adult help that they have available to them.

Project SKILL was built around the premise that each student should have a diagnosis of his skills and abilities, with appropriate experiences to be planned for those areas of weakness which need reinforcement. Mathematics was the target subject for the work that was done in Project SKILL. A principal feature of the instructional strategy in the project was the planned transfer of responsibility

from the teacher to the student for his own instructional diagnoses, prescriptions, and evaluations. Student involvement in learning through self-directed and self-initiated activities was encouraged.

The Title III statewide needs assessment found that a number of critical needs must be delt with through special efforts. Project SKILL addressed the following needs:

1. Development of student involvement and student interest in the learning process with accompanying development of responsibility in participation and decision making.

2. Establishment of educator-learner relationships which promote understanding, respect and communication between students and educators.

3. Building of a positive self-image in the student by providing him with a sense of dignity and pride, to foster a sense of identity, encouraging self-confidence and a willingness to meet challenging situations.

Procedures:

At the onset of the project, the planning committee met to discuss ways of meeting the goals and objectives which had been predetermined. After surveying all possible ways of individualizing mathematics, a decision was made to use a system called Individually Prescribed Instruction as the basic curriculum. IPI Mathematics is an instructional system based upon a set of behaviorial objectives correlated with diagnostic instruments, curriculum materials, and teaching techniques. The 386 behaviorial objectives (or skills) are organized into 15 broad areas of mathematics and 8 levels of competency forming 83 units which constitute the continuum.

Following is a sequential listing of the steps the student takes

in the cycle of diagnosis, prescription and learning:

1. The student is placed in a unit on the skills continuum by a placement test.

2. The student takes a pretest to determine exactly what skills he needs to work on.

3. The teacher writes a prescription to fit the student's individual needs. This is essentially an individual lesson plan for each student each day.

4. The student works on a teaching sequence involving IPI instructional materials or other prescribed activities. When the student's work is completed, the aide corrects it and the student returns to the teacher for a new prescription.

5. The student's mastery of each skill in a unit is evaluated by a curriculum embedded test.

6. A posttest is given at the end of each unit to determine mastery.

The unique feature of Project SKILL was the development of alternative strategies for meeting the specific needs of students who function better in different learning modes. Research for Better Schools realizes that IPI programs can not always stand on their own, but need amplification at the local level.

Project SKILL endeavored to build teacher made materials, self-instructional tapes, and manipulative materials into the program. These items contributed greatly to the program flexibility which was offered to students.

Another Project SKILL modification was the emphasis which was placed upon team-teaching in the IPI setting. Teams of two teachers worked together in teaching 55-70 students in a resource center. This arrangement provided much more flexibility on the part of the

instructors in meeting the needs of students. One member of the team worked as a diagnostician in evaluating assessment information while the other member concentrated on helping small groups or individuals. This arrangement proved to be quite satisfactory for both teachers and students.

Pocket charts were devised so that each student's progress could be plotted with quick information retrevial for teachers. In this way, small groups could be assembled to work on common areas of need with little loss of time.

Physical arrangements were altered at Midland School to accomodate the project goals. The west attic was remodeled to form a resource center for the intermediate grades. Furniture and shelving were added to accomodate the specialized materials which were required for the project. The district installed carpeting and an air conditioner in the room to create a more suitable environment for learning.

A classroom in the primary wing was remodeled to accomodate the IPI programs for grades one through three. Appropriate furniture and hardware were installed.

Staff training was an important element of the project since new instructional procedures needed to be developed for an individualized teaching mode. The project planning committee was initially involved in training and all teachers participated in summer workshops before entering the project. In addition, the Project Director conducted frequent inservice meetings with the faculty to assess progress and plan for future program components.

At the onset of the project, plans were made to keep parents and the community informed of changes that were made in the basic school

structure and curriculum to accomodate the Project SKILL goals. Numerous presentations were made to the PTA and other parent groups and printed summaries were distributed to interested people. The teachers discussed the IPI philosophy and procedures with pupils and parents through special conferences and at the end of each school term.

Project SKILL has attracted much attention over the past three years and many visitors from around the Northwest have come to see the programs. Research for Better Schools has recognized the efforts of the project by naming Midland School as an IPI Demonstration School in mathematics and reading. Midland is one of only 40 such schools in the nation and the only such school in the Pacific Northwest.

In each year of Project SKILL, new components have been added to the Midland Program as the project has expanded. In addition, some of the project components have been exported to other schools in the district though Title III money was only used at Midland. Following is a summary of project developments:

YEAR	SCHOOL	COMPONENT
1969-70	Midland	Individualized Math - grade 4
1970-71	Midland	Individualized Math - grades 3,4,5,6
1971-72	Midland	Individualized Math - grades 3,4,5,6 Individualized Reading - grades 1,2,3, 4,5,6
	Parkland	Individualized Reading - grades 4,5,6
	Brookdale	Individualized Math - grades 2,3,4,5,6
	Christensen	Individualized Math - grades 3,4,5,6

During the final year of Project SKILL, Midland served as a training center for the three other schools in the district that

started IPI programs. As the year progressed, members of the Midland faculty consulted with the three new schools as help was needed. In this way, the project was expanded to include many more students.

Project SKILL - Three Year Budget Summary

Title III Funds:	1969-70	1970-71	1971-72	TOTAL
Certificated Salaries	$ 9,000	$ 8,800	$ 818	$ 18,618
Classified Salaries	3,600	9,851	13,868	27,319
Employee Benefits	882	1,604	1,860	4,346
Supplies and Materials	3,800	5,460	7,550	16,810
Contratual Services	2,000	1,800		3,800
Travel and Communication	3,320	970	700	4,990
Capital Outlay	3,575	3,515	____	7,090
	$26,177	$32,000	$24,796	$82,973

Regular Funds:

1969-70	75 students at $630 per student =	$ 47,250
1970-71	240 students at $660 per student =	158,400
1971-72	360 students at $680 per student =	244,800
		$450,450

Title III funding for Project SKILL accounted for 15.2% of the toal cost of the operation.

EVALUATION

Pupil Achievement in Mathematics:

In the spring of 1971, the Franklin Pierce District instituted a district-wide assessment of academic achievement by means of the Comprehensive Tests of Basic Skills (CTBS). The mathematics portion of the test consists of three components: Computations, Concepts, and Applications.

In the 1971 testing, the Project SKILL students performed well on the Concepts component, but considerably below grade level on the Computation and Application components. A number of possible explanations were offered: Was there a lack of correspondence between the content being taught in the IPI continuum and what the CTBS measured? Was there good correspondence between the two, but was teaching by means of the IPI curriculum somehow inadequate? Were substantial numbers of pupils moving too slowly through the IPI continuum? A study was undertaken to pursue these questions. (This study was previously reported to the ESEA Title III Grants Management Section as "EVALUATION REPORT: Examination of I.P.I. Math in Midland Elementary School." Additional copies are available through the Franklin Pierce evaluation department.)

The results of the study indicated good correspondence (on the whole) tetween the IPI continuum and the CTBS measures. However, many "slow learners" were progressing very slowly through the con-

tinuum. Several changes were instituted by the Project Director and the Midland Staff to correct the weakness in implementation.

Considerable concern was also expressed by the Midland Staff regarding the relatively poor performance of the students on two of the CTBS components. It was of great interest, then to examine the Project SKILL students' performance on the 1972 testing.

While the CTBS tests were initially given in June, 1971, the tests were administered in April of the following year (1972). Therefore, a normal grade-level equivalent score gain would be 8 months for any given test.

Data from three other schools in the same general geographic area and serving communities of similar socio-economic levels were chosen as comparison schools. Five 6th grade boys and five 6th grade girls were randomly selected from each school. Their scores were pooled and compared with a randomly selected sample of fifteen 6th grade boys and fifteen 6th grade girls who were completing their third year in Project SKILL. Data for each student from his 5th and 6th grade years were included in the analysis. These data were analyzed in a 2 x 2 x 2 x 3 Analysis of Variance (Schools x Sex x Year x Component) with repeated measures on the component and year factors. A summary of the analysis appears in Table 1. The effects of particular interest for this report are those involving Factor A (Schools). That is, in what ways, if any, does the performance of pupils in the IPI program differ from those of pupils not in the IPI program?

Four of the 15 testable effects in the analysis were highly significant while one other was of marginal significance. The main effect for Year (C) was highly significant ($F = 58.40$; $df = 1, 56$; $p < .001$).

Table 1

Analysis of Variance Summary of the CTBS Scores

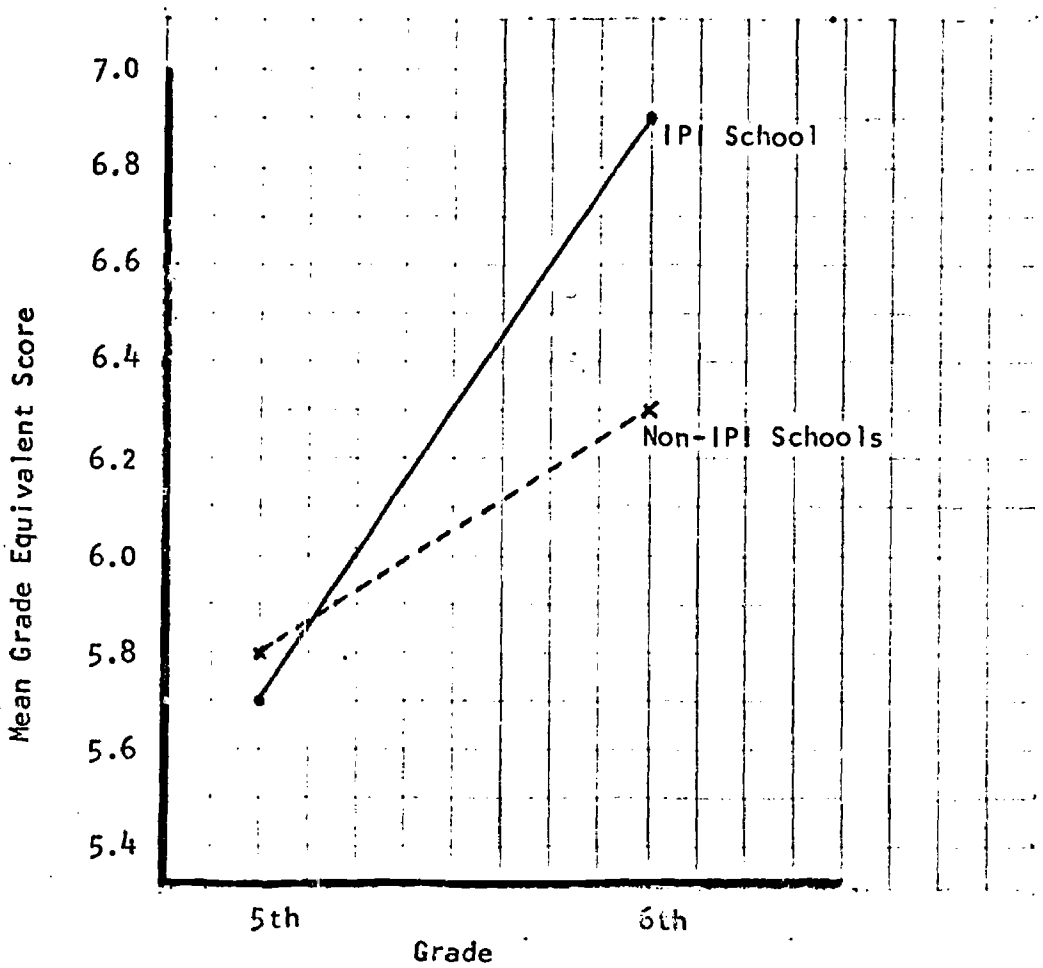
Source	ss	df	ms	F	P
A (Schools)	7,075.60	1	7,075.60	-----	ns
B (Sex)	208.55	1	208.55	-----	ns
AB	3,276.10	1	3,276.10	-----	ns
$^{e}(A,B)$	1,054,311.04	56	18,826.98		
C (Year)	97,285.35	1	97,285.35	58.40	$<.001$
AC	14,263.21	1		8.56	$<.001$
BC	263.50	1		-----	ns
ABC	7.52	1		-----	ns
$^{Ce}(A,B)$	93,279.76	56	1,665.71		
D (Components)	27,264.03	2	13,632.01	8.19	$<.001$
AD	6,557.40	2	3,278.70	1.97	ns
BD	3,378.68	2	1,689.34	1.01	ns
$^{De}(A,B)$	186,352.03	112	1,663.86		
CD	12,974.48	2	6,487.24	5.60	$<.001$
ACD	5,129.16	2	2,564.58	2.22	$<.10$
BCD	1,059.50	2	524.75	-----	ns
ABCD	1,738.41	2	869.26	-----	ns
$^{CDe}(A,B)$	129,558.11	112	1,156.76		

As would certainly be expected, overall performance at the 6th grade level was higher than at the 5th grade level. The School x Year (A x C) interaction was also highly significant ($F = 8.56$; $df = 1, 56$; $p < .001$) indicating that the progress of the same students going from 5th to 6th grade was different for IPI than for Non-IPI pupils. This effect is represented graphically in Figure I. At the end of the 5th grade, both groups performed at a similar overall level. But the growth for the IPI sample was from 5.7 to 6.9 grade level equivalents, a growth of 1 year and 2 months, while that for the Non-IPI sample was from 5.8 to 6.3 grade level equivalents, a growth of 5 months. Since at the 5th grade testing Project SKILL pupils appeared particularly low on the Computation component of the CTBS, it is of some interest to determine whether the pronounced growth on the part of IPI pupils shown in the A x C effect occurred for each of the three components. This leads us to examine the A x C x D interaction which was of marginal significance ($F = 2.22$; $df = 2, 112$; $p < .10$). The effect is presented graphically in Figure II.

As the graph shows, the most dramatic gains were made by Project SKILL pupils (IPI) and particularly on the two components on which they had performed poorest in the previous year. In this respect, the results are consistent with an interpretation of the statistical regression effects, but the conditions do not warrant such an interpretation. The IPI pupil sample was, of course, <u>not selected</u> on the basis of low scores in the previous year's testing. It is conceivable that the low previous year's mean on Computations

Figure 1

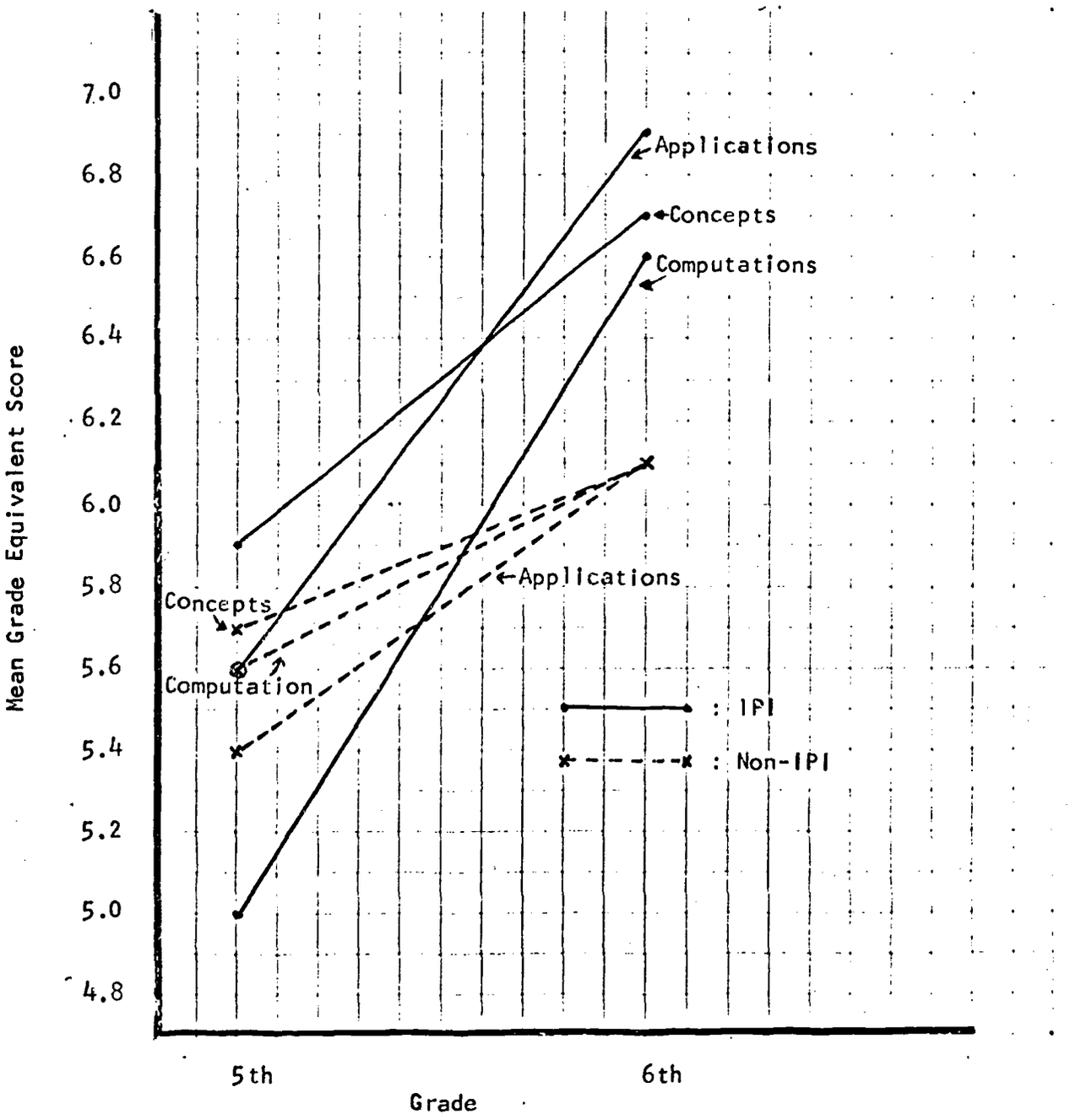
Mean CTBS Score on Math for the IPI School and Non-IPI Schools
(Data from Same Students Each Year)
(School x Year (A x G) interaction; $p < .001$)



was a statistical anomaly in the sense of containing an inordinate amount of measurement error. To the extent that this is the case, the observed change could, in part, be attributed to a regression effect. But a more plausible explanation for the high growth rate on the part of the IPI pupils would seem to reside in the response of the Midland School Staff to the feedback from the

Figure 11

Changes in Each of the CTBS Components
for IPI and Non-IPI Pupils
($p < .10$)



previous year's performance.

As the Project Director met with the Midland School Staff to discuss weaknesses in the program during the previous year, two areas of concern became apparent: (1) Students were not moving through the IPI continuum rapidly enough to master the objectives which should be learned at each grade level, and (2) Students in Project SKILL showed a serious deficiency in mathematics computational skills. Each of these weaknesses was analyzed and steps were taken to make changes which would improve the efforts of Project SKILL.

The teachers met with their classes to discuss ways in which students could make greater progress through the IPI continuum. The assumption was that by covering more objectives, students would show greater achievement gains on the CTBS tests in future years. Procedures were devised to make more students eligible to be "self-correctors" so that less time would be spent in waiting for feedback. Students who still had to wait for corrections by the aides were asked to work on other materials which were related to the mathematics objective they were pursuing.

The teachers were asked to check the progress of each student once per week by looking completely through his folder to assess the student's progress rate and determine if he was having any serious problems with his studies.

The Project Director created a set of 23 progress graphs which were used by the students starting January 3rd to plot their progress through the continuum (a sample graph is included in the appendix).

These graphs utilized the Precision Teaching philosophy of encouraging an improved rate of progress through making a visual representation of the data on a daily basis. At the end of every mathematics period each student was asked to plot the skill in which he was working and draw a line from that point to the position where he had stopped working on the previous day.

To assess the effect of the graphing procedure, a sample group of sixth graders was selected for this purpose. Seven "high" and seven "low achievers" were previously identified in the 1970-71 report. Since that time, one "high achiever" transferred to another school so the progress of six "high achievers" and seven "low achievers" was studied to ascertain the effects of progress graphing.

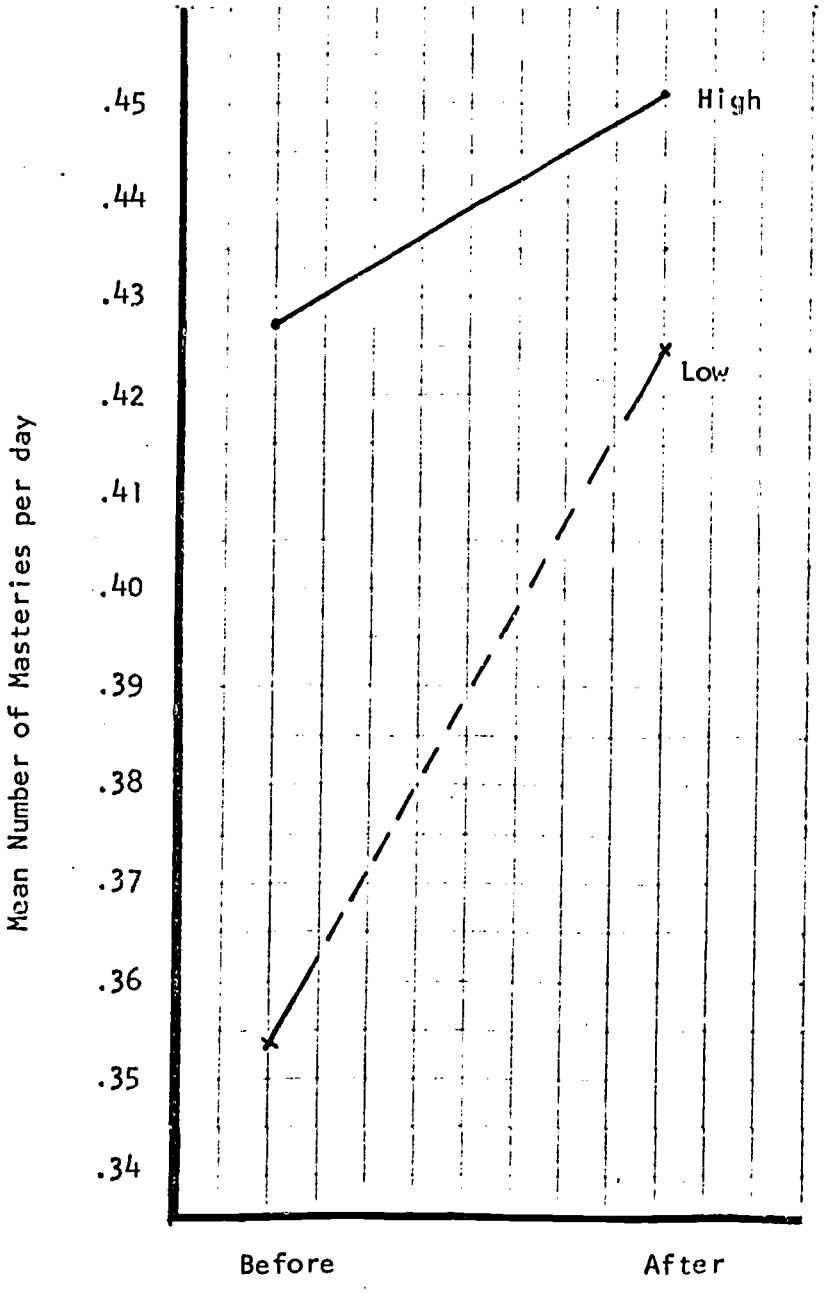
The mean number of skill masteries per day was computed for "high" and "low achievers" for the periods of time before and after the graphing procedure was instituted. "High achievers" mastered an average of .427 objectives per day before the graphing procedure was started and an average of .452 objectives per day after the procedure began. "Low achievers" mastered an average of .357 objectives per day prior to the start of the graphing procedure and .424 objectives per day after the procedure began. The data on mean number of objectives mastered per day by both groups is represented in Figure III.

It was noted that 9 of the 13 target students showed a change in a positive direction with a greater number of masteries achieved after the graphing procedure was instituted. The probability of getting 9 out of 13 changes in a positive direction is 1.33 (Sign Test).

An Analysis of Variance test was performed on the means and the

Figure III

Mean Number of Masteries Per Day for "High" and "Low Achievers"
Before and After Instituting Graphing Procedures
(A x B; ns)



results are reported in Table II. None of the factors was significant although the data favored the students after the graphing procedure was begun. The four students (two "high" and two "low achievers") who showed reversed directions in the analysis contributed to the effect of making the results not significant. Inspite of this factor, it is safe to say that the graphing procedure probably contributed to increasing the number of IPI skill masteries for a majority of the target students.

Table II

Analysis of Variance Summary of Mean Number of Masteries Per Day of IPI Skill Objectives for Six "High" and Seven "Low Achievers"

Source	ss	df	ms	F	P
A (High-Low)	.0155	1	.0155	1.962	ns
$^{C}(A)$	.0873	11	.0079		
B (Before-After)	.0149	1	.0149	-----	ns
AB	.0028	1	.0028	-----	ns
$^{BC}(A)$	.1968	11	.0178		

To evaluate the effects of the changes which were made in the IPI implementation procedures, records were kept of the number of masteries by sixth graders and these were compared with the number of masteries made by these same students when they were in the fifth grade during the previous year. This quantitative data is presented in Table III with the total number of masteries pooled into three-

week intervals with means computed for the pre- and post-Christmas vacation periods and the entire year.

Table III

Number of Masteries Made by 63 Sixth Grade Students Compared with the Number of Masteries Made by the Same Group as Fifth Graders (with Means for Pre- and Post-Christmas Vacation Periods and Each Entire Year)

3-Week Period Ending:	Sept. 22	Oct. 21	Nov. 12	Dec. 7	Pre-Christmas Means
1970-71 Year	34	48	65	54	50.5
1971-72 Year	22	48	48	53	42.8

3-Week Period Ending:	Jan. 11	Feb. 4	Feb. 28	Mar. 20	Apr. 13	May 4	May 25	Post-Christmas Means	Total Means
1970-71 Year	46	41	36	27	43	40	47	40.4	43.4
1971-72 Year	54	44	41	65	71	45	68	55.4	50.8

The reader will observe that the total number of masteries per three-week period increased substantially during the 1971-72 school year. During the period of time after Christmas Vacation, the average number of masteries by sixth graders was 55.4 for each three-week period compared with an average of 40.4 for the same students last year. This happened inspite of the increased difficulty level of the material which was being studied at the older level. It would appear that the process of having students graph their own progress has had a marked effect on improving the number of masteries which were accomplished in the IPI continuum.

On the basis of the data presented on the number of masteries,

and the CTBS analysis, it can be concluded that the implementation changes which were introduced by the Midland Staff this year have had a very strong effect upon the quantity and quality of achievement in mathematics by the students working in Project SKILL.

The weakness in the area of mathematical computational skills was also given serious consideration by the teachers and students. At each grade level, methods of practicing basic arithmetic operations were devised with appropriate practice given to students as needed. Teachers varied their approach to include short "mini-lessons" quite frequently or longer lessons on a once per week schedule. During time in which students waited for corrections during the IPI periods, they worked with flash cards, manipulative devices or used special review cassette tapes on an independent basis. While there is insufficient data to document the type of support work provided by the teachers, it is very likely that this work contributed to the strong growth on the computational component of the CTBS analysis.

Pupil Attitudes Toward School:

A district-wide assessment of pupil attitudes on a 10% random sample (stratified by school and grade level) provided a unique opportunity to compare the attitudes of pupils who were in Project SKILL for three years with those from comparable schools who had not been in a similar program. Three schools in the same geographic area and serving communities sharing similar socio-economic characteristics were selected as comparison schools.

The Pupil Opinion Questionnaire (POQ) is a 60 item Likert scale

containing 15 items each for measuring attitudes toward Teachers, School Work, School in General, and Peers. Data from the random samples of sixth graders in three comparison schools were combined into Male and Female groups and compared with data from Male and Female sixth graders in Project SKILL, all of whom had been administered the POQ. A 2 x 2 x 4 (IPI vs. Non-IPI Schools x Sex x POQ Components) Unweighted Means Analysis of Variance was performed on the POQ scores. A summary of that analysis appears in Table IV. The effects of primary interest are those involving Factor A (IPI vs. Non-IPI). Only one of those effects approached significance. The results appear in graphic form in Figure IV.

Table IV

Analysis of Variance Summary of the Pupil Opinion Questionnaires

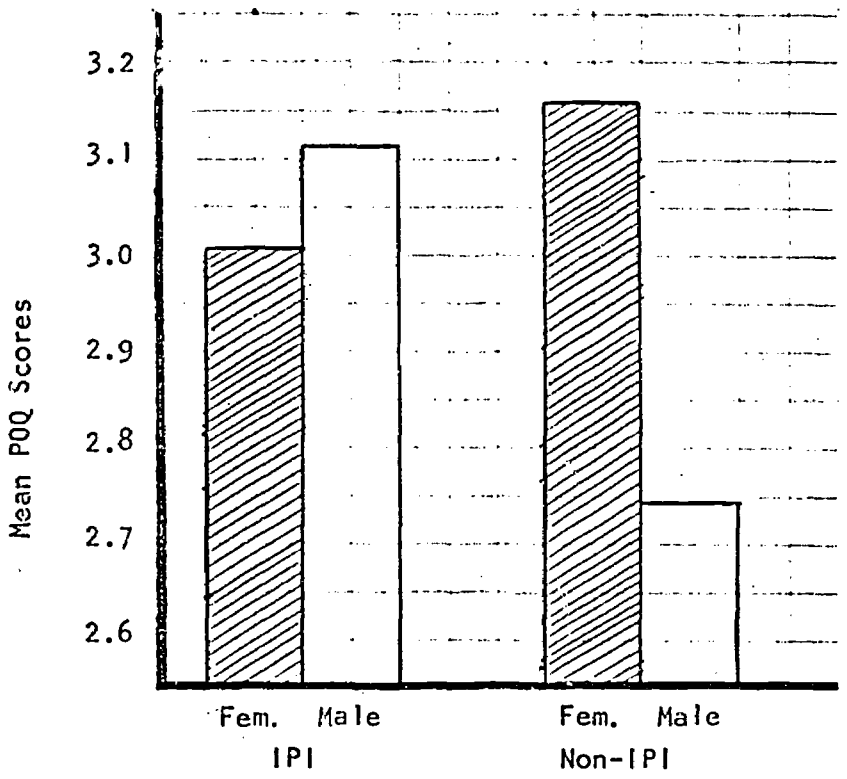
Source	ss	df	ms	F	P
A (IPI--Non-IPI)	.0986	1	.0986	2.054	ns
B (sex)	.1433	1	.1433	2.985	ns
AB	.1879	1	.1879	3.915	< .10
$^{d}(A,B)$	3.9379	82	.0480		
C (POQ-Components)	.2975	3	.0991	19.058	< .005
AC	.0123	3	.0041	-----	ns
BC	.0868	3	.0289	5.558	< .005
ABC	.0225	3	.0075	1.442	ns
$^{Cd}(A,B)$	1.7831	246	.0052		

In the IPI school, there appears to be a much smaller discrepancy between male and female pupils in the overall attitude score. And, in

the IPI school male attitudes are slightly more favorable than female attitudes while in the combined data from the three comparison schools male attitudes are strikingly lower, on the average, than female attitudes which were the highest of the four comparison groups.

Figure IV

A x B (IPI vs. Non-IPI x Sex) Interaction
($p < .10$)



The score "3" is the midpoint on the scale. Scores higher than "3" may be interpreted as reflecting a favorable attitude and scores below "3" an unfavorable attitude. The only subgroup whose mean score falls markedly below "3" is males in the Non-IPI schools. Since this effect was not highly significant statistically, the reader should be

cautious in his interpretation.

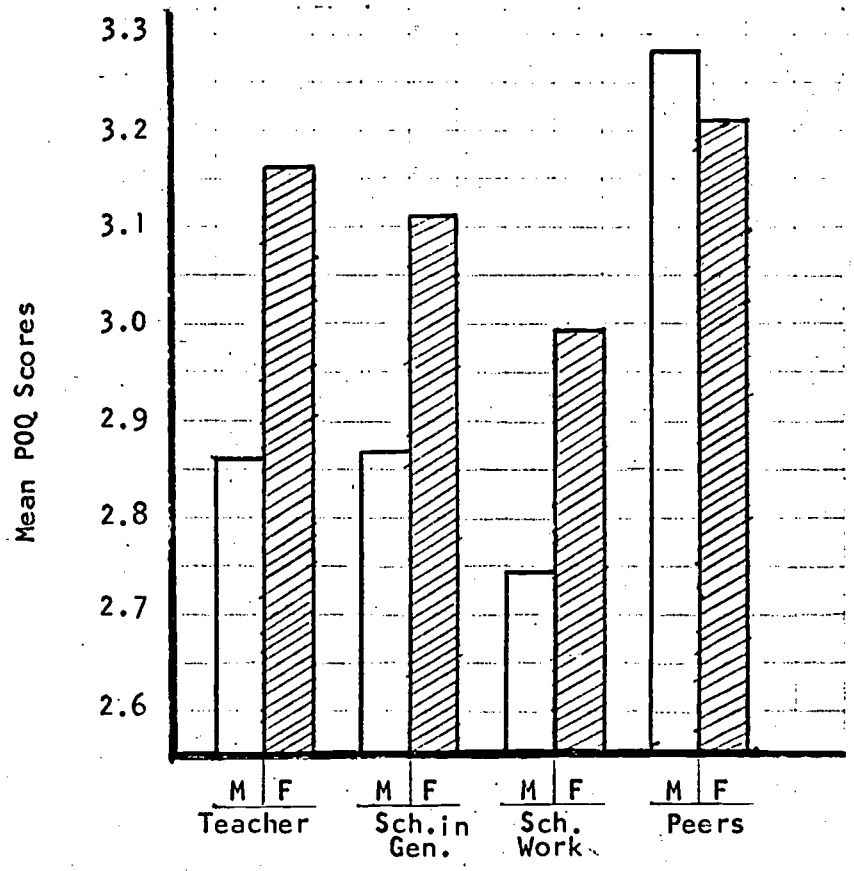
Since students at Midland School have been working in individualized programs in mathematics and reading which are not as competitive as traditional programs, it is possible that this factor has affected Male attitudes in a positive way. Some authorities believe that the attitudes of many males in the tradional elementary school program suffer.because of the competitive nature of the learning environment. In an individualized program, this competitive situation is reduced greatly. This research study is not prepared to document this possibility since there are many other variables between schools besides the curriculum and teaching modes. The findings are worth pursuing further, however, within the Experimental Schools evaluation program. Do the IPI programs enhance male pupil attitudes toward school? What are the characteristics of the program that produce the effect?

The components (C) effect and the components by Sex interaction (B x C) were highly significant in the analysis of variance. The B x C interaction is presented graphically in Figure V. It is clear from inspection of Figure V that the effect derives from the differences between Male and Female attitudes toward peers as compared to those toward Teachers, School Work, and School in General: Male attitudes toward Peers are slightly more favorable than are those of females but markedly lower than females in the other three instances. Indeed, Male attitudes, other than toward Peers, are on the average, below the midpoint of "3" on the scale.

In light of the A x B and B x C effects, it should be of some

Figure V

Results of the B x C (Sex by Component) Interaction
($p < .005$)



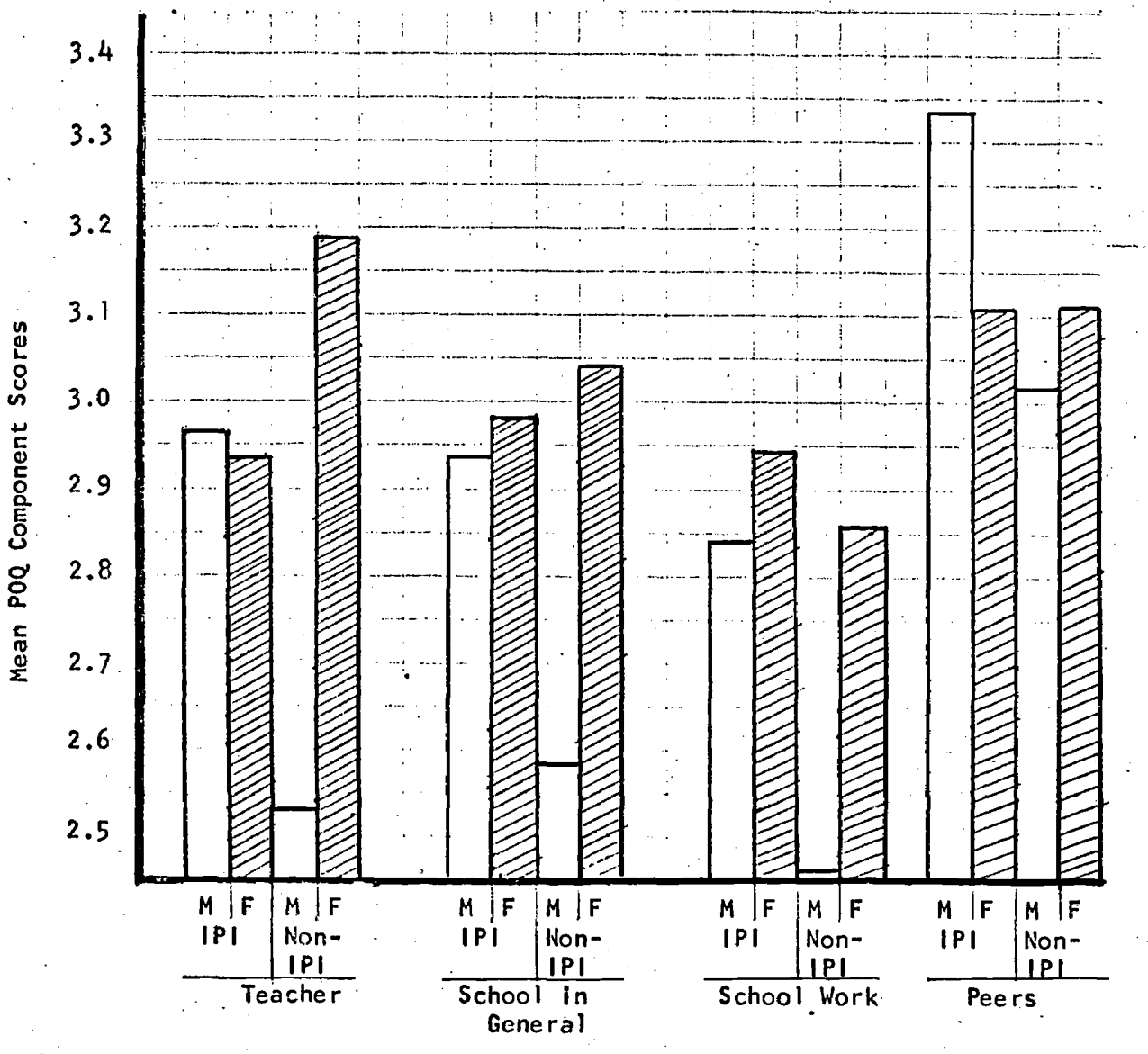
interest to observe the A x B x C effect, even though this effect did not approach significance. This effect is presented graphically in Figure VI. On each of the attitude components, Male pupils in the Non-IPI schools yield considerably lower mean scores than do Male pupils who have been in Project SKILL. With the exception of the Peers component, the comparison schools' means are also markedly below the neutral point of "3" on the scale. Mean scores of Males in Project SKILL are near the "3" point on the scale on the same components and markedly higher on attitudes toward Peers, where they have

the highest mean score of any of the groups.

In summary, the data on pupil attitudes toward school favors students who have participated in Project SKILL, but not at a statistically significant level. The data for Females were very similar for IPI and Non IPI schools, with subgroup means near the scale midpoint of "3" or slightly above. With the exception of the Peers

Figure VI

The A x B x C (IPI vs. Non-IPI x Sex x Components) Interaction (ns)



component, mean scores for Males from the Non-IPI schools were markedly below those of Males in Project SKILL and the scale mid-point of "3". Male attitudes toward peers were particularly favorable at the IPI school.

It is suggested that the differences between IPI and Non-IPI males be pursued further within the context of the Experimental Schools evaluation program to determine: (1) if they are reliable, and (2) if further evidence can be brought to bear on the question of whether or not the differences can be attributed to the programs in Individually Prescribed Instruction.

Pupil Attitudes Toward Mathematics -- Subject Preference Inventory:

While the Pupil Opinion Questionnaire assesses attitudes toward broad areas of school experience, such as "School Work" for example, the Project SKILL objectives were also addressed specifically to attitudes toward the subject "Mathematics". This objective was assessed by having pupils rank-order their preferences of eight subject matter areas. (A copy of the instrument is included in the Appendix.) The same instrument was used in the 1970-71 Project SKILL Annual Report. The rank orders assigned to mathematics by Midland pupils were compared with those in an adjacent school not utilizing the IPI program. As indicated in the 1970-71 report, there was a statistically significant tendency for relatively fewer Project SKILL pupils to assign very low rankings to mathematics as compared to the Non-IPI pupils.

In conjunction with a district-wide attitude assessment on a 10% random sample of pupils, it was decided to obtain the subject

matter rankings from this sample in the three other schools in the geographic area sharing similar socio-economic characteristics. This broadens the comparison base for interpreting the results of the data from IPI pupils and hence strengthens the conclusions that may be drawn.

Table V presents the frequencies with which pupils assigned each of the eight possible rankings to mathematics (1 was the highest preference). A casual inspection of the Table does not reveal

Table V

Frequencies and Percentages (in Parentheses) of Each of Eight Possible Ranks Assigned to Mathematics

	RANKS							
	1	2	3	4	5	6	7	8
IPI Pupils	13 (21)	8 (12)	14 (22)	4 (6)	15 (24)	4 (6)	3 (5)	2 (3)
Non-IPI Pupils from 3 Schools*	5 (22)	3 (13)	1 (4)	3 (13)	3 (13)	2 (9)	3 (13)	3 (13)

*10% random sample of sixth graders from each school

stronger preferences for mathematics by either group over the other. Is there a tendency, as was found in the 1970-71 report, for fewer pupils in Project SKILL to assign mathematics to very low preference rankings? Table VI presents the results with the five highest and three lowest rankings combined.

Fourteen percent of the Project SKILL pupils assigned mathematics to one of the three lowest rankings while 34% of the

Table VI

Frequencies and Percentages (in Parentheses) of Preference Ranks Assigned to Mathematics with Five Highest and Three Lowest Ranks Combined

	1-5 Ranks	6-8 Ranks
IPI Pupils	54 (86)	9 (14)
Non-IPI Pupils from 3 schools	15 (66)	8 (34)

$\chi^2 = 3.26$, $p < .10$

sample of Non-IPI pupils assigned mathematics to those rankings. Although the Chi Square computed on this 2 x 2 table fell short of the .05 level of significance $\chi^2 = 3.84$ is required, the pattern replicates last years pattern and, with the broadened comparison base, strengthens the conclusion that the IPI mathematics program results in fewer pupils having unfavorable attitudes toward the subject of mathematics (as indicated by very low preference rankings).

Pupil Attitudes Toward Mathematics and Reading -- Semantic Differential Scale:

A series of 13 bipolar adjective scales were constructed for measuring attitudes toward a variety of subject matter areas, including mathematics and reading. (A copy of each instrument is included in the Appendix.) Data on mathematics and reading were obtained from all of the sixth graders in Project SKILL and compared with a random sample from three other schools. Mean scores were computed over the 13 scales and a 2 x 2 x 2 (IPI vs. Non-IPI x Sex x Math-Reading)

Analysis of Variance. A summary of the analysis appears in Table VII.

Table VII

Analysis of Variance Summary of Mean Semantic Differential Ratings on Mathematics and Reading

Source	ss	df	ms	F	P
A (IPI vs. Non IPI)	.2712	1	.2712	1.303	ns
B (Sex)	.1878	1	.1876	-----	ns
AB	.0709	1	.0709	-----	ns
$d_{(A,B)}(Ss)$	14.7734	71	.2081		
C (Subj.)	.0023	1	.0023	-----	ns
AC	.0252	1	.0252	-----	ns
BC	.2617	1	.2617	2.950	$< .10$
ABC	.0098	1	.0098	-----	ns
$Cd_{(A,B)}$	6.2999	71	.0887		

The effects involving the IPI vs. Non-IPI Factor (A) are of most interest in the analysis. None of the effects involving this factor were significant. The overall mean for the IPI pupils was slightly higher than that for Non-IPI pupils (5.13 vs. 4.77), a difference that held for both mathematics and reading (math: 5.06 vs. 4.80; reading; 5.21 vs. 4.73). The only effect in the analysis that approached significance was the Sex by Subject (B x C) interaction ($F = 2.95$; $df = 1, 71$; $p < .10$). As might be expected, females rated reading more favorably than math (5.27 vs. 4.94) while the reverse was the case for males (4.60 vs. 5.00).

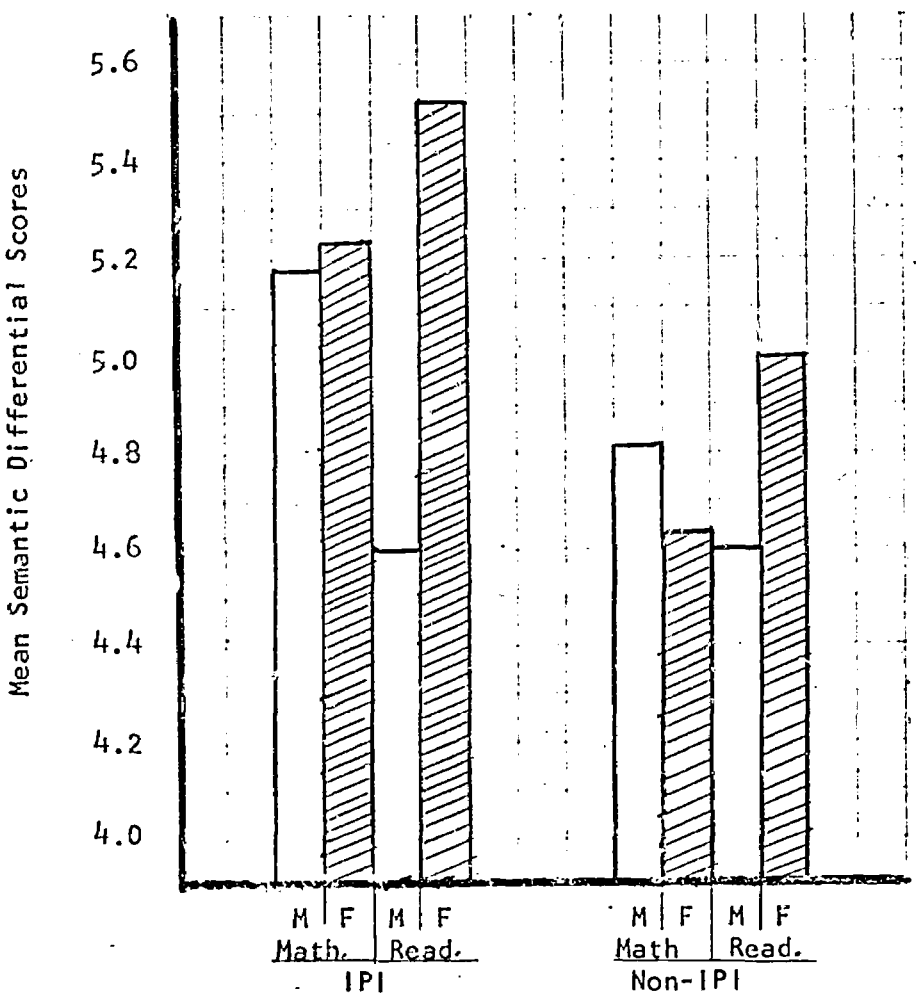
The mean values for the A x B x C Interaction ($F = 1.00$; $df = 1, 71$;ns)

are presented in Figure VII. With the exception of Male ratings of reading, mean scores for IPI pupils exceed those of Non-IPI pupils on each comparison. These generally consistent differences were not sufficient to produce a significant main effect for the IPI vs. Non-IPI (A) comparison, however ($F = 1.30$; $df = 1, 71$; ns).

The results of this analysis cannot support the conclusion that the IPI individualized programs in mathematics and reading enhance attitudes toward those subjects, though the data do lean in that direction.

Figure VII

Mean Ratings for Pupil Attitudes Toward Mathematics and Reading in IPI and Non-IPI Schools (ns)



Teacher Attitudes Toward Teaching Mathematics--Semantic Differential:

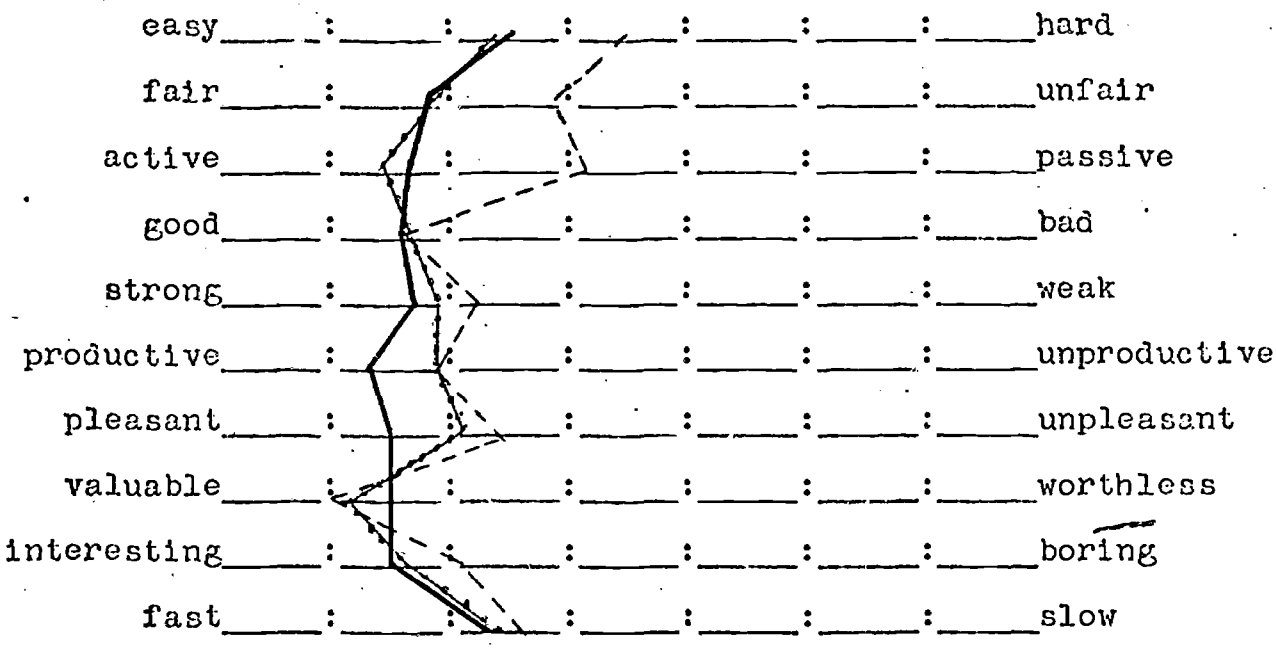
As part of the evaluation design for the 1970-71 year, a semantic differential scale was constructed and administered to teachers in grades three through six on several occasions. Composite attitudes were figured and plotted to show how attitudes of the Project SKILL teachers changed over the course of the year. Comparative data were plotted for October and April and growth in a positive direction was achieved. In addition, composite attitudes of Midland teachers were compared with composite attitudes of a comparison group of teachers who serve a similar student population in a traditional program. Statistical testing was done on the concept "team teaching" and a significant difference was found in favor of the Project SKILL teachers.

For the Final Report, a decision was made to use the previous results (from April, 1971) as baseline data. The instrument was then administered in the spring of 1972 to determine what changes, if any, had occured. The composite results from Project SKILL teachers from April, 1972, are reported as a heavy black line. The solid line with dots represents responses of Project SKILL teachers from April, 1971. The line made of dashes represents the responses of teachers in the comparison school in April, 1971. All composite responses are reported on the next seven pages.

On each concept, the reader will observe that the attitudes of Midland teachers toward the teaching of mathematics have remained very high through the third year of the project. This is significant because any possibility of a "Hawthorne Effect" was virtually eliminated by this time. Inspite of the extra burden of implementing an individualized program, Project SKILL teachers expressed attitudes which were at least

Mathematics Teaching Materials

All books, work books, skill booklets, papers, manipulative devices, audio-visual aids, and other such materials used in the teaching of mathematics to students.



Key:

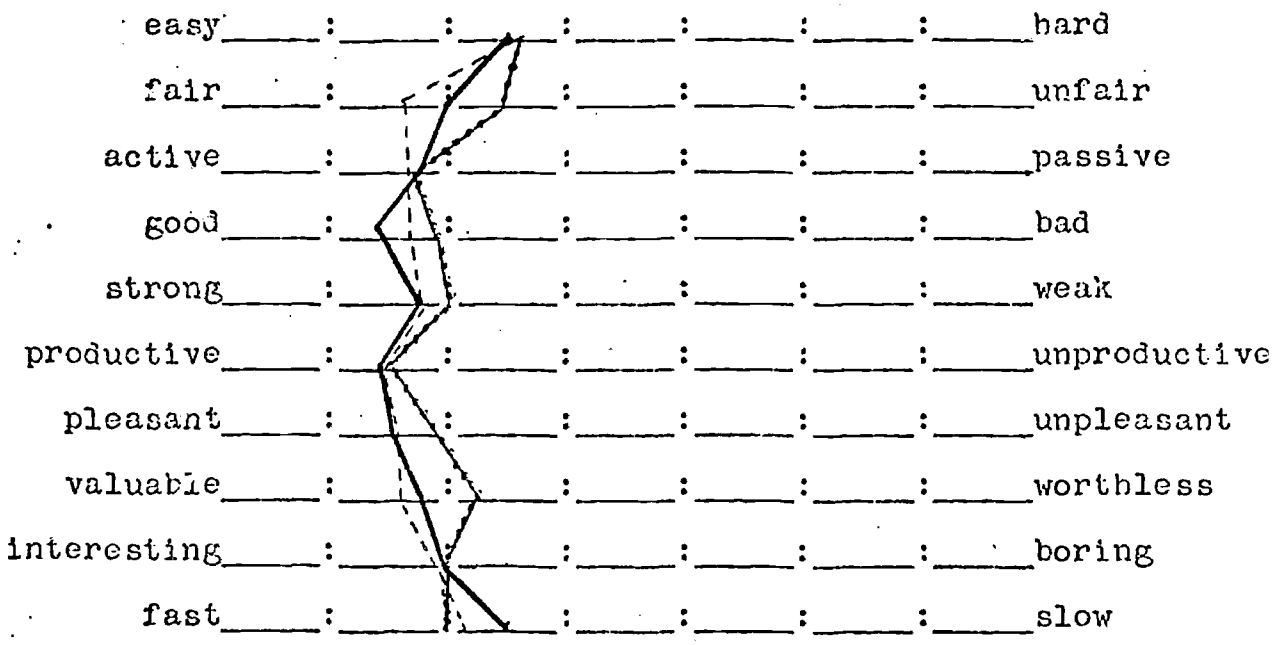
Project SKILL Teachers, 1971

Comparison Teachers, 1971

Project SKILL Teachers, 1972

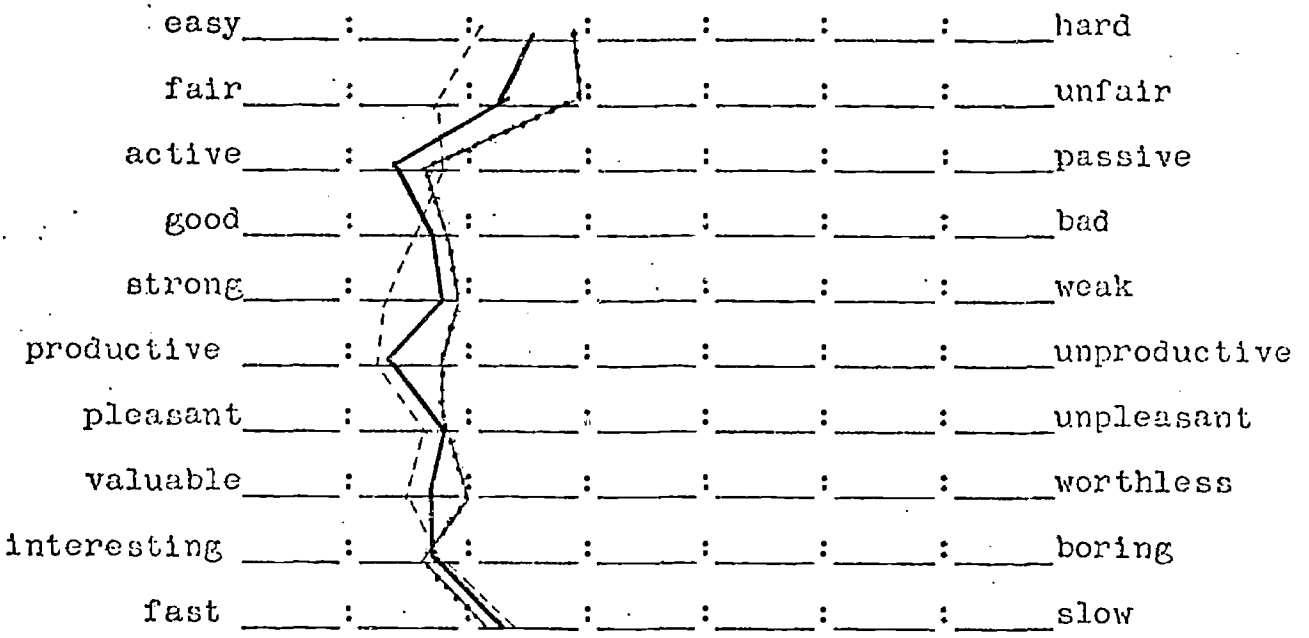
Student Behavior

The way in which students apply themselves to their tasks. Their cooperation with peers and teachers. The students' willingness to follow accepted classroom practices and procedures.



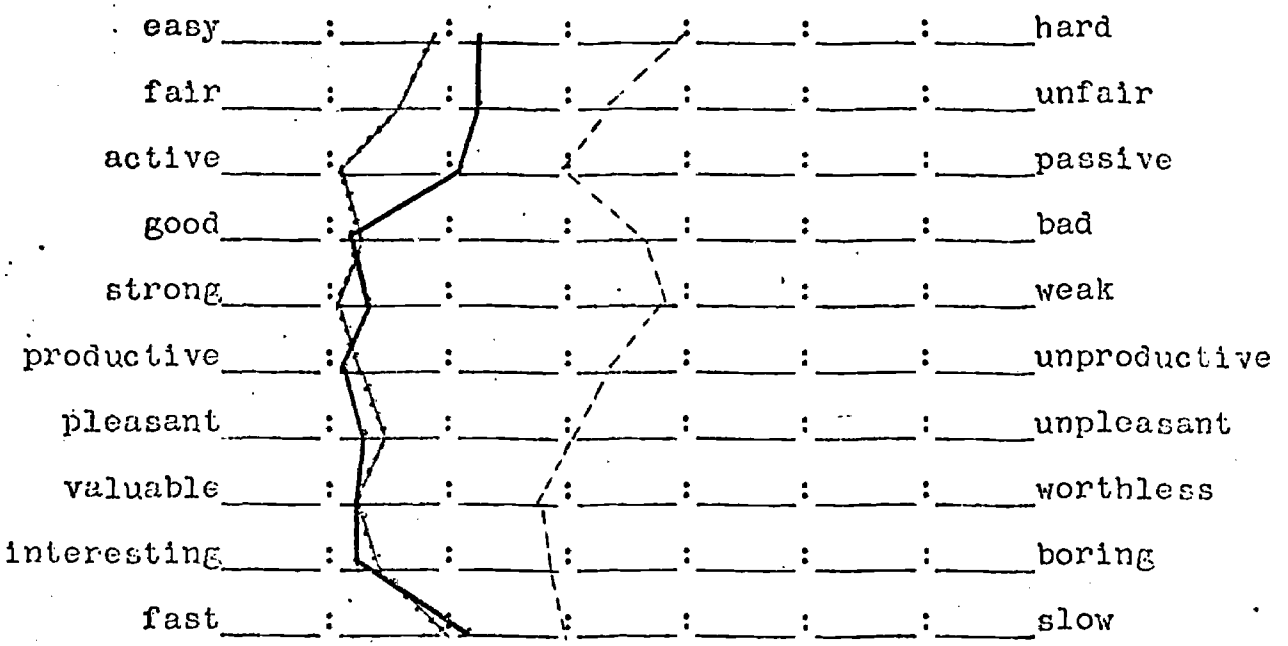
Mathematics Students

The teacher's perception of his students' as "learners of mathematics." This includes their motivation and dedication to the learning task.



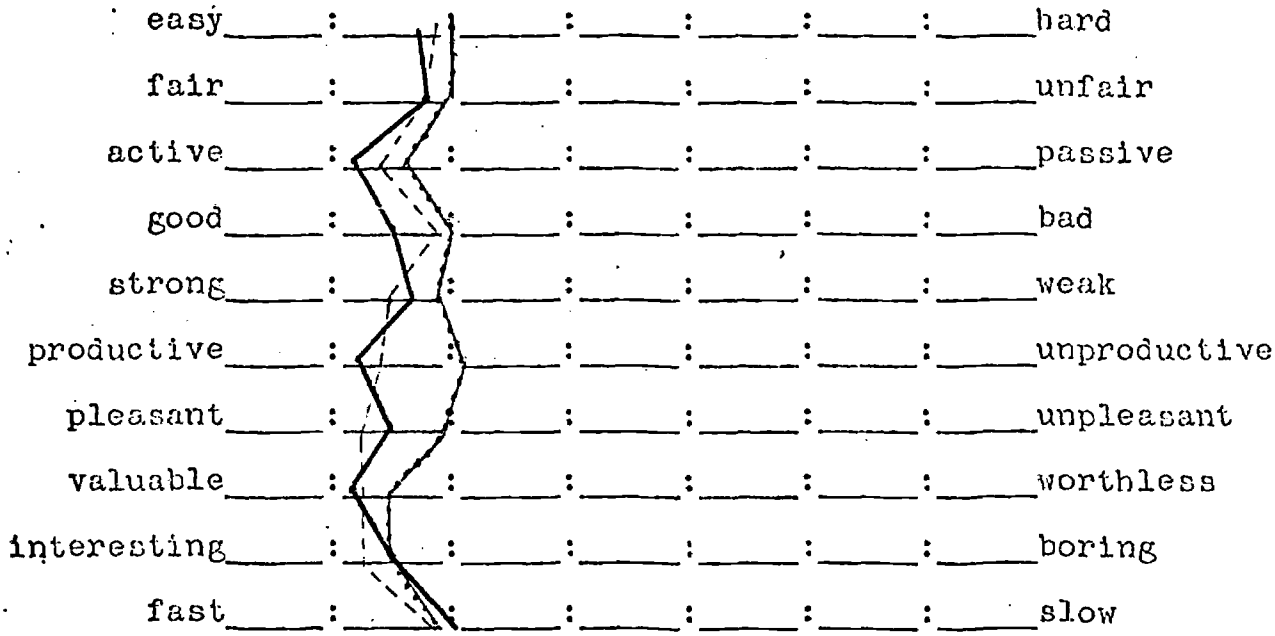
Team Teaching

A situation where two or more teachers work cooperatively with a large group of students in a large instructional area.



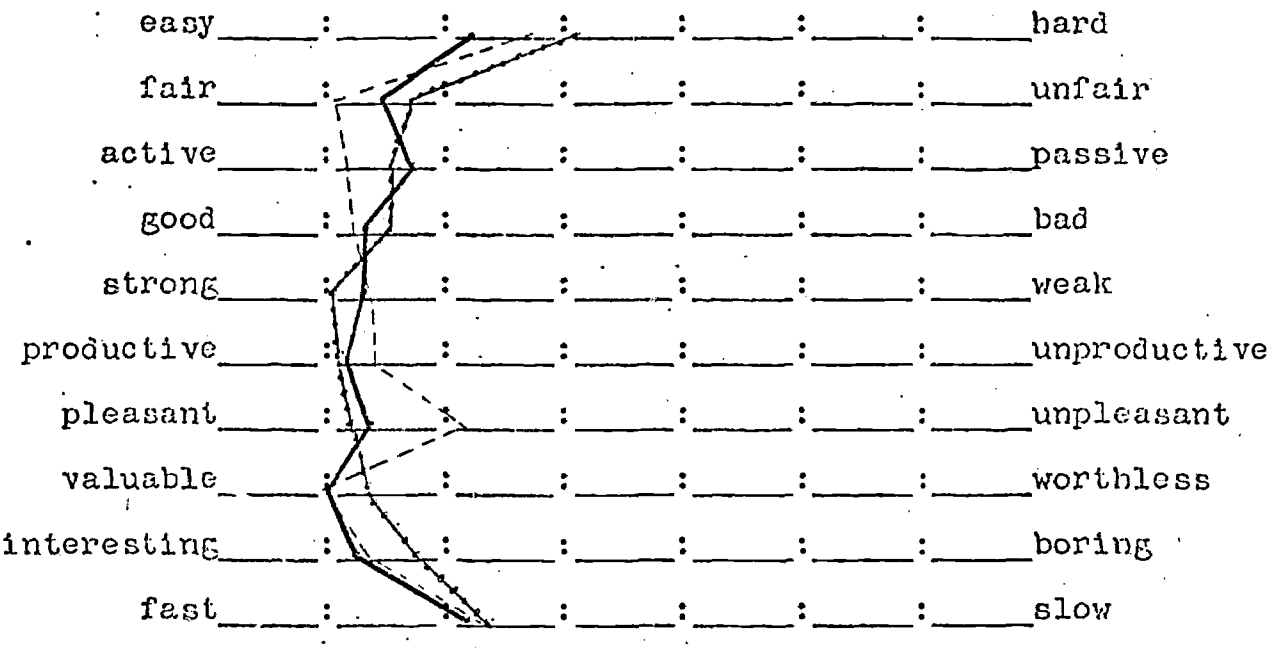
Teaching Mathematics

The teacher's perception of the process of teaching mathematics.



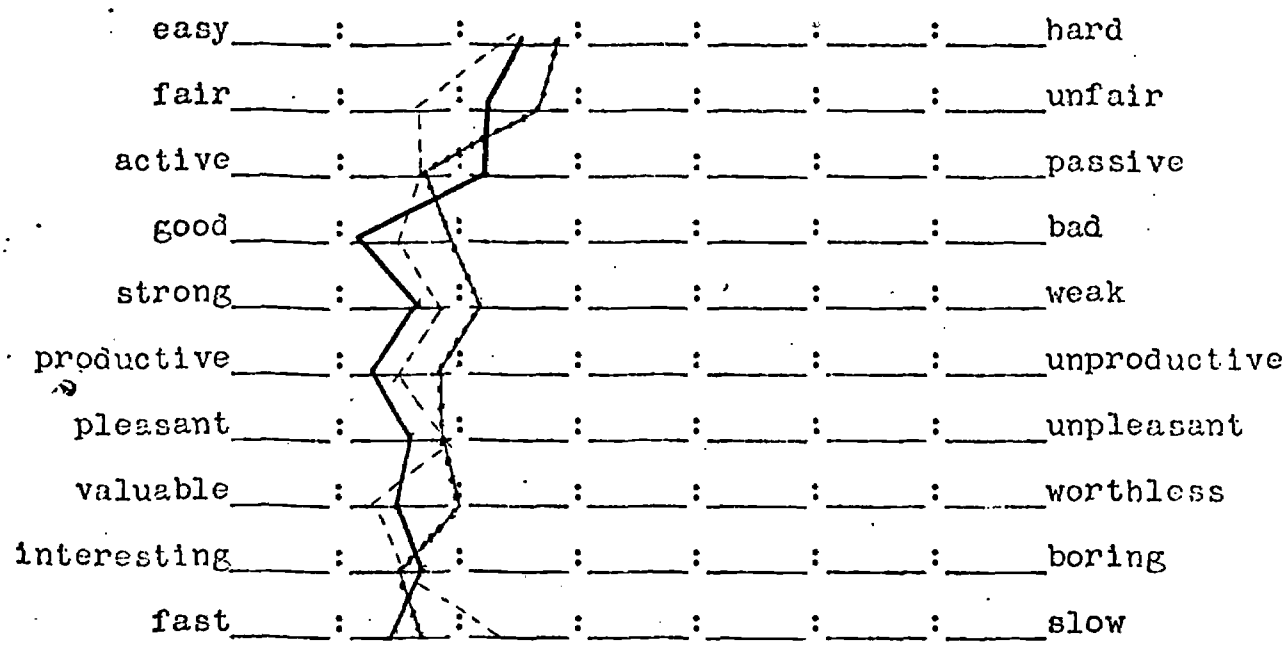
Individualizing Instruction

The process of tailoring a specific instructional program to meet the needs of each individual student.



Mathematics Achievement

The teacher's perception of the quantity and quality of mathematics achievement which takes place in his room.



as good as the attitudes of the teachers working in a traditional program.

Teacher Attitudes Toward Teaching Mathematic--Teaching Preference:

Another method of assessing the attitudes of teachers toward the teaching of mathematics was through a "Teaching Preference Inventory." (See the Appendix for a copy of the instrument.) Teachers in Project SKILL and teachers in two nearby comparison schools were asked to rank-order eight subject matter areas with respect to their teaching preferences. Data from the three schools is presented in Table VIII

Table VIII

Frequencies and Percentages (in Parentheses) of Each of Eight Possible Preference Ranks Assigned to Mathematics by IPI and Non-IPI Teachers

	1	2	3	4	5	6	7	8
IPI Teachers	3 (37)	2 (25)	1 (12)	1 (12)	1 (12)	0	0	0
Non-IPI School #1	7 (58)	1 (8)	2 (17)	0	2 (17)	0	0	0
Non-IPI School #2	4 (50)	1 (12)	0	0	2 (25)	1 (12)	0	0

It is apparent from Table I that mathematics is a highly preferred teaching area in all three schools. The mean rankings were 2.38, 2.08, and 2.75 for the IPI School, Comparison School #1 and Comparison School #2, respectively. The mean for the IPI teachers thus falls between those of the two comparison schools. In both comparison schools, however, a slightly higher percentage of the teachers ranked mathematics as their first preference than did

IPI teachers.

A 2 x 2 analysis of the frequency of first and non-first rankings by IPI and Non-IPI teachers did not yield a Chi Square value that approached significance ($\chi^2 = .18$, df - 1). A comparison of the frequency with which mathematics was ranked in first or second place versus rankings greater than second place showed nearly identical patterns between IPI and Non-IPI teachers. The data are presented in Table IX

Table IX

Frequencies and Percentages (inParentheses) of Preference Rankings in First or Second Position vs. Positions Greater Than Two

	Position 1 or 2	Positions Greater Than 2
IPI Teachers	5 (62)	3 (38)
Non-IPI Teachers	13 (65)	7 (35)

Approximately two-thirds of all the teachers ranked mathematics in either first or second place as a preferred teaching area.

It may be concluded from these data that the IPI mathematics program does not result in the teachers becoming more favorable toward mathematics as a preferred teaching area, nor does it reduce an already generally high preference among teachers for teaching mathematics.

Summary of Evaluation Results:

While the evaluation of Project SKILL included a number of interim objectives, three major areas received most of the assess-

ment and evaluation effort. These were: (1) the level of mathematics achievement reached by pupils, (2) the attitudes of pupils working in individualized programs toward those subjects and toward school, and (3) the attitudes of teachers working in an individualized teaching mode toward those subjects and toward teaching in general. The following results have been documented within this report for the 1971-72 school year:

(1) Pupils in Project SKILL reached significantly higher achievement levels than pupils from comparison schools on the total mathematics score on a standardized test.

(2) Pupils in Project SKILL reached higher achievement levels than pupils from comparison schools in the "Applications," "Concepts," and "Computations" components on a standardized test.

(3) Pupils working in the third year of Project SKILL made greater gains in mathematics achievement than what is normally expected in one year.

(4) On the basis of the previous year's evaluation data, the Midland Staff made several substantial changes in the implementation of the program. It appears that as a result of these changes, Project SKILL pupils mastered more IPI curriculum objectives in 1971-72 than in 1970-71.

(5) On a Pupil Opinion Questionnaire, Project SKILL pupils (especially males) had slightly better attitudes toward school than a similar population in comparison schools.

(6) As measured on a Subject Preference Inventory, significantly fewer pupils in Project SKILL showed very unfavorable attitudes toward mathematics than a similar population in other schools.

(7) As measured by a semantic differential, there was no significant difference between Project SKILL pupils and pupils in a comparison group in attitudes toward mathematics and reading, although the data favored the individualized pupils.

(8) The attitudes toward the teaching of mathematics (as measured on a semantic differential scale) of both Project SKILL teachers and teachers in a comparison group were both very high throughout the course of the project.

(9) Teachers in Project SKILL who have worked in an individualized mathematics program for several years still rank the subject as a preferred teaching area, as do teachers working in group instructional modes with basal texts.

RECOMMENDATIONS

The evaluation data on Project SKILL supports the validity of using such an instructional approach in the elementary school setting. The Project Director and the Midland Faculty are pleased with the gains made by students and feel that the extra expenditure of time and money for this project was justified. The Superintendent, Director of Elementary Education, and Franklin Pierce School Board of Directors have supported the goals of the project. For these reasons, the Franklin Pierce School District intends to continue the program which was begun under Title III funding at Midland School.

The Principal and Midland Staff will continue to work on improving the efficiency and effectiveness of the program so that substantial gains can continue to be made by students with the possibility of further reducing the costs. At the same time, the Midland Staff will continue to assist other schools in the district who decide to implement the system of Individually Prescribed Instruction along with the modifications which have been made through Project SKILL.

The following recommendations are made for future evaluation efforts of this and similar programs.

(1) Continue to assess achievement to ascertain whether the results shown in 1971-72 will continue indefinitely. Start to document the effects of the individualized reading programs in grades one through six.

(2) Continue the assessment of the Affective Domain to document differences, if any, which might occur in individualized vs. basal text programs. Study the attitudes of Males to see if the differences reported in this study continue. If there are differences

among the Males, document the reasons for the differences.

(3) Continue to measure the attitudes of teachers working in individualized programs vs. those working with basal texts. If differences occur, endeavor to discover why.

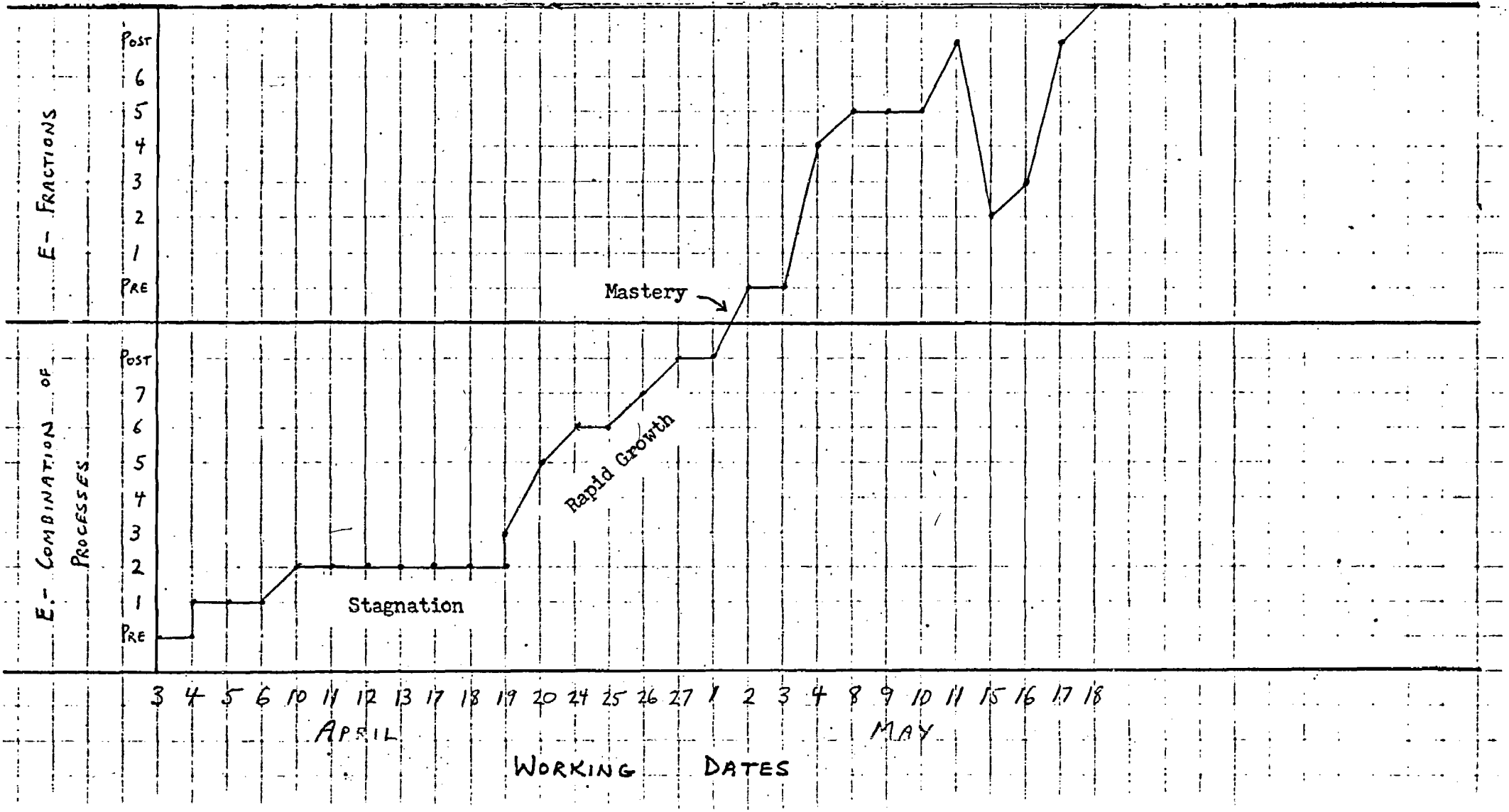
(4) Do follow-up studies on students who have received instruction in individualized programs at the elementary level to see what performance levels they reach in the secondary schools.

Appendix

GRAPH #12

I.P.I. PROGRESS GRAPH

STUDENT'S NAME _____



PUPIL OPINION QUESTIONNAIRE

1. Most things about school are all right.
2. Most school work which pupils have to do is worth the effort.
3. Most of my classes are enjoyable.
4. There are many teachers who do not know how to teach.
5. Pupils who do not do their daily lessons should be kept in after school to do them.
6. Pupils in school should try to work together.
7. Most teachers are crabby.
8. The school is often the reason why pupils are absent.
9. Every pupil does his part when the class is working together.
10. We seem to be doing the "same old things" over and over again in school.
11. It is easy to get along with most teachers.
12. Going to school is a lot of fun.
13. As a rule teachers want too much work from pupils.
14. Going to school is too difficult and discouraging.
15. Most pupils learn what they have to learn, not because they want to learn.
16. Most of the things which the teacher does are all right.
17. Most group work in school does not get very much work done.
18. Teachers are usually too busy to talk with pupils.
19. Most pupils really want to do their school work.
20. Most pupils ask others to join them in their work or play.

21. Most teachers try to force pupils to learn something.

22. Most pupils really enjoy going to school.

23. Pupils really do not learn the things in school that they want to learn.

24. Teachers punish pupils too much.

25. A pupil should do more school work than he has to do.

26. All the popular kids get all the good things in school.

27. Everything in school is too strict.

28. Most pupils really enjoy working with their classmates.

29. Teachers really do not understand children.

30. Most pupils like doing their school work.

31. Most pupils are afraid of their teachers.

32. There are always some pupils in class who do not consider others.

33. Too much of what we have to study does not make sense.

34. Teachers are too bossy.

35. It is hard to make friends in school.

36. Pupils have to keep reading and studying the same things over and over in school.

37. Most pupils would be better off if they never went to school at all.

38. It is all right to be unfriendly to some of the pupils in school.

39. Most pupils would rather work by themselves rather than in a group.

40. My daily school work is full of things that keep me interested.

41. There is little chance to get to know other pupils in school.

42. Most things a person needs on a job are learned in school.

43. One should always think of himself before thinking about others.

44. Teachers care about what is good for pupils.

45. What pupils learn in school is more important than most people think.

46. Having to go to school is like having to go to jail.

47. Teachers pick on some pupils for no reason at all.

48. Most of the pupils in my classes are friendly towards each other.

49. Pupils are always treated fairly in school.

50. In most school groups, there are only one or two pupils who are important.

51. Most pupils feel that they can trust their teacher.

52. Too much nonsense goes on in school.

53. Teachers expect too much of pupils.

54. What pupils learn in school is old fashioned, not new things.

55. School can be very boring at times.

56. Some pupils are always making fun of other pupils in school.

57. There is too much importance placed on grades in school.

58. Most pupils are not interested in learning.

59. Teachers always seem to like some pupils better than others.

60. Pupils do not have very much freedom in school.

Subject Preference Inventory

Name _____

School _____

Grade _____

The following list shows most of the subjects which you study in school. Put a "1" by the subject which you like most. Put a "2" by the subject that you like next best. Continue to rate the subjects in the order in which you like them with: 3, 4, 5, 6, 7, and 8. Number "8" will be the subject that you like least of all.

_____ Spelling

_____ Music

_____ Science

_____ Reading

_____ Mathematics

_____ English

_____ Social Studies

_____ Art

Thank you for giving your opinion. It is very helpful when students can tell what they think about school.

OBJECT OF RATING: MATH

Hard	___:	___:	___:	___:	___:	___:	___:	Easy
Good	___:	___:	___:	___:	___:	___:	___:	Bad
Challenging	___:	___:	___:	___:	___:	___:	___:	Nothing to it
No Fun	___:	___:	___:	___:	___:	___:	___:	Fun
A drag	___:	___:	___:	___:	___:	___:	___:	Really cool
Stimulating	___:	___:	___:	___:	___:	___:	___:	Boring
Learned a lot	___:	___:	___:	___:	___:	___:	___:	Learned nothing
Free	___:	___:	___:	___:	___:	___:	___:	Controlled
Interesting	___:	___:	___:	___:	___:	___:	___:	Boring
Worthless	___:	___:	___:	___:	___:	___:	___:	Worthwhile
Pleasant	___:	___:	___:	___:	___:	___:	___:	Unpleasant
Ugly	___:	___:	___:	___:	___:	___:	___:	Beautiful
Unrewarding	___:	___:	___:	___:	___:	___:	___:	Rewarding

OBJECT OF RATING: READING

Hard	___:	___:	___:	___:	___:	___:	___:	Easy
Good	___:	___:	___:	___:	___:	___:	___:	Bad
Challenging	___:	___:	___:	___:	___:	___:	___:	Nothing to it
No Fun	___:	___:	___:	___:	___:	___:	___:	Fun
A drag	___:	___:	___:	___:	___:	___:	___:	Really cool
Stimulating	___:	___:	___:	___:	___:	___:	___:	Boring
Learned a lot	___:	___:	___:	___:	___:	___:	___:	Learned nothing
Free	___:	___:	___:	___:	___:	___:	___:	Controlled
Interesting	___:	___:	___:	___:	___:	___:	___:	Boring
Worthless	___:	___:	___:	___:	___:	___:	___:	Worthwhile
Pleasant	___:	___:	___:	___:	___:	___:	___:	Unpleasant
Ugly	___:	___:	___:	___:	___:	___:	___:	Beautiful
Unrewarding	___:	___:	___:	___:	___:	___:	___:	Rewarding

TEACHING PREFERENCE INVENTORY

SCHOOL _____

GRADE _____

The following list shows most of the subjects which you might teach in school. Put a "1" by the subject which you would most like to teach. Put a "2" by the subject that you would next most like to teach. Continue to rank the subjects in the order in which you would most like to teach them: 3, 4, 5, 6, 7, and 8. Number "8" will be the subject that you would least like to teach.

_____ MUSIC

_____ SCIENCE

_____ READING

_____ MATHEMATICS

_____ ENGLISH

_____ SOCIAL STUDIES

_____ ART

_____ SPELLING